

$$E_c(\text{Corridor}) = \left(\sum_{k=1}^n E_{c_k} \right) \quad (\text{Equation D7})$$

(viii) Alternative casualty expectancy (E_c) analysis. An applicant may employ specified variations to the analysis defined by subparagraphs (d)(1)(i)–(vii). Those variations are identified in subparagraphs (viii)(A) through (F) of this paragraph. Subparagraphs (A) through (D) permit an applicant to make conservative assumptions that would lead to an overestimation of E_c compared with the analysis defined by subparagraphs (d)(1)(i)–(vii). In subparagraphs (E) and (F), an applicant that would otherwise fail the analysis prescribed by subparagraphs (d)(1)(i)–(vii) may avoid (d)(1)(i)–(vii)'s overestimation of the probability of impact in each populated area. An applicant employing a variation shall identify the variation used, show and discuss the specific assumptions made to modify the analysis defined by subparagraphs (d)(1)(i)–(vii), and demonstrate how each assumption leads to overestimation of the corridor E_c compared with the analysis defined by subparagraphs (d)(1)(i)–(vii).

(A) Assume that P_x and P_y have a value of 1.0 for all populated areas.

(B) Combine populated areas into one or more larger populated areas, and use a popu-

lation density for the combined area or areas equal to the most densely populated area.

(C) For any given populated area, assume P_x has a value of one.

(D) For any given populated area, assume P_y has a value of one.

(E) For a given populated area, divide the populated area into smaller rectangles, determine P_i for each individual rectangle, and sum the individual impact probabilities to determine P_i for the entire populated area.

(F) For a given populated area, use the ratio of the populated area to the area of the P_i rectangle used in the subparagraph (d)(1)(i)–(vii) analysis.

(2) If the estimated expected casualty does not exceed 30×10^{-6} , the FAA will approve the launch point.

(3) If the estimated expected casualty exceeds 30×10^{-6} , then an applicant may modify its proposal and then repeat the impact risk analysis in accordance with this appendix D. If no set of impact dispersion areas exist which satisfy the FAA's risk threshold, the applicant's proposed launch site will fail the launch site location review.

APPENDIX E TO PART 420—TABLES FOR EXPLOSIVE SITE PLAN

TABLE E-1—QUANTITY DISTANCE REQUIREMENTS FOR SOLID EXPLOSIVES

Quantity (lbs.) (over)	Quantity (lbs.) (not over)	Public area distance (ft.) for division 1.1	Public area distance (ft.) for division 1.3	Intraline distance (ft.) for division 1.1	Intraline distance (ft.) for division 1.3
0	1,000	1,250	75	$D = 18 W^{1/3}$	50
1,000	5,000		115		75
5,000	10,000		150		100
10,000	20,000		190		125
20,000	30,000		215		145
30,000	40,000	$D = 40 W^{1/3}$	235		155
40,000	50,000		250		165
50,000	60,000		260		175
60,000	70,000		270		185
70,000	80,000		280		190
80,000	90,000		195		195
90,000	100,000		300		200
100,000	200,000	$D=2.42 W^{0.577}$	375		250
200,000	250,000		413		275
250,000	300,000	$D = 50 W^{1/3}$	450		300
300,000	400,000		525		350
400,000	500,000		600		400
500,000	1,000,000		800		500
Greater than 1,000,000		$D = 50 W^{1/3}$	$D = 8 W^{1/3}$	$D = 5 W^{1/3}$	

"D" equals the minimum separation distance in feet.
 "W" equals the NEW of propellant.

TABLE E-2—LIQUID PROPELLANT EXPLOSIVE EQUIVALENTS

Propellant combinations	Explosive equivalent
LO ₂ /LH ₂	The larger of: 8W ^{2/3} where W is the weight of LO ₂ /LH ₂ , or 14% of W.
LO ₂ /LH ₂ + LO ₂ /RP-1	Sum of (20% for LO ₂ /RP-1) + the larger of: 8W ^{2/3} where W is the weight of LO ₂ /LH ₂ , or 14% of W.
LO ₂ /R-1	20% of W up to 500,000 pounds plus 10% of W over 500,000 pounds, where W is the weight of LO ₂ RP-1.
N ₂ O ₄ /N ₂ H ₄ (or UDMH or UDMH/N ₂ H ₄ Mixture)	10% of W, where W is the weight of the propellant.

TABLE E-3—PROPELLANT HAZARD AND COMPATIBILITY GROUPINGS AND FACTORS TO BE USED WHEN CONVERTING GALLONS OF PROPELLANT INTO POUNDS

Propellant	Hazard group	Compatibility group	Pounds/gallon	At temperature °F
Hydrogen Peroxide	II	A	11.6	68
Hydrazine	III	C	8.4	68
Liquid Hydrogen	III	C	0.59	-423
Liquid Oxygen	II	A	9.5	-297
Nitrogen Tetroxide	I	A	12.1	68
RP-1	I	C	6.8	68
UDMH	III	C	6.6	68
UDMH/Hydrazine	III	C	7.5	68

TABLE E-4—HAZARD GROUP I

Pounds of propellant		Public area and incompatible	Intragroup and compatible	Pounds of propellant		Public area and incompatible	Intragroup and compatible
Over	Not over			Over	Not over		
		Distance in feet	Distance in feet			Distance in feet	Distance in feet
0	100	30	25	5,000	6,000	80	60
100	200	35	30	6,000	7,000	85	65
200	300	40	35	7,000	8,000	85	65
300	400	45	35	8,000	9,000	90	70
400	500	50	40	9,000	10,000	90	70
500	600	50	40	10,000	15,000	95	75
600	700	55	40	15,000	20,000	100	80
700	800	55	45	20,000	25,000	105	80
800	900	60	45	25,000	30,000	110	85
900	1,000	60	45	30,000	35,000	110	85
1,000	2,000	65	50	35,000	40,000	115	85
2,000	3,000	70	55	40,000	45,000	120	90
3,000	4,000	75	55	45,000	50,000	120	90
4,000	5,000	80	60	50,000	60,000	125	95
60,000	70,000	130	95	500,000	600,000	185	140
70,000	80,000	130	100	600,000	700,000	190	145
80,000	90,000	135	100	700,000	800,000	195	150
90,000	100,000	135	105	800,000	900,000	200	150
100,000	125,000	140	110	900,000	1,000,000	205	155
125,000	150,000	145	110	1,000,000	2,000,000	235	175
150,000	175,000	150	115	2,000,000	3,000,000	255	190
175,000	200,000	155	115	3,000,000	4,000,000	265	200
200,000	250,000	160	120	4,000,000	5,000,000	275	210
250,000	300,000	165	125	5,000,000	6,000,000	285	215
300,000	350,000	170	130	6,000,000	7,000,000	295	220
350,000	400,000	175	130	7,000,000	8,000,000	300	225
400,000	450,000	180	135	8,000,000	9,000,000	305	230
450,000	500,000	180	135	9,000,000	10,000,000	310	235

TABLE E-5—HAZARD GROUP II

Pounds of propellant		Public area and incompatible	Intragroup and compatible	Pounds of propellant		Public area and incompatible	Intragroup and compatible
Over	Not over			Over	Not over		
		Distance in feet	Distance in feet			Distance in feet	Distance in feet
0	100	60	30	50,000	60,000	250	125
100	200	75	35	60,000	70,000	255	130
200	300	85	40	70,000	80,000	260	130
300	400	90	45	80,000	90,000	265	135
400	500	100	50	90,000	100,000	270	135
500	600	100	50	100,000	125,000	285	140
600	700	105	55	125,000	150,000	295	145
700	800	110	55	150,000	175,000	305	150
800	900	115	60	175,000	200,000	310	155
900	1,000	120	60	200,000	250,000	320	160
1,000	2,000	130	65	250,000	300,000	330	165
2,000	3,000	145	70	300,000	350,000	340	170
3,000	4,000	150	75	350,000	400,000	350	175
4,000	5,000	160	80	400,000	450,000	355	180
5,000	6,000	165	80	450,000	500,000	360	180
6,000	7,000	170	85	500,000	600,000	375	185
7,000	8,000	175	85	600,000	700,000	385	190
8,000	9,000	175	90	700,000	800,000	395	195
9,000	10,000	180	90	800,000	900,000	405	200
10,000	15,000	195	95	900,000	1,000,000	410	205
15,000	20,000	205	100	1,000,000	2,000,000	470	235
20,000	25,000	215	105	2,000,000	3,000,000	505	255
25,000	30,000	220	110	3,000,000	4,000,000	535	265
30,000	35,000	225	110	4,000,000	5,000,000	555	275
35,000	40,000	230	115	5,000,000	6,000,000	570	285
40,000	45,000	235	120	6,000,000	7,000,000	585	295
45,000	50,000	240	120	7,000,000	8,000,000	600	300
				8,000,000	9,000,000	610	305
				9,000,000	10,000,000	620	310

TABLE E-6—HAZARD GROUP III

Pounds of propellant		Public area and incompatible	Intragroup and compatible	Pounds of propellant		Public area and incompatible	Intragroup and compatible
Over	Not over			Over	Not over		
		Distance in feet	Distance in feet			Distance in feet	Distance in feet
0	100	600	30	60,000	70,000	1,200	130
100	200	600	35	70,000	80,000	1,200	130
200	300	600	40	80,000	90,000	1,200	135
300	400	600	45	90,000	100,000	1,200	135
400	500	600	50	100,000	125,000	1,800	140
500	600	600	50	125,000	150,000	1,800	145
600	700	600	55	150,000	175,000	1,800	150
700	800	600	55	175,000	200,000	1,800	155
800	900	600	60	200,000	250,000	1,800	160
900	1,000	600	60	250,000	300,000	1,800	165
1,000	2,000	600	65	300,000	350,000	1,800	170
2,000	3,000	600	70	350,000	400,000	1,800	175
3,000	4,000	600	75	400,000	450,000	1,800	180
4,000	5,000	600	80	450,000	500,000	1,800	180
5,000	6,000	600	80	500,000	600,000	1,800	185
6,000	7,000	600	85	600,000	700,000	1,800	190
7,000	8,000	600	85	700,000	800,000	1,800	195
8,000	9,000	600	90	800,000	900,000	1,800	200
9,000	10,000	600	90	900,000	1,000,000	1,800	205
10,000	15,000	1,200	95	1,000,000	2,000,000	1,800	235
15,000	20,000	1,200	100	2,000,000	3,000,000	1,800	255
20,000	25,000	1,200	105	3,000,000	4,000,000	1,800	265
25,000	30,000	1,200	110	4,000,000	5,000,000	1,800	275
30,000	35,000	1,200	110	5,000,000	6,000,000	1,800	285
35,000	40,000	1,200	115	6,000,000	7,000,000	1,800	295
40,000	45,000	1,200	120	7,000,000	8,000,000	1,800	300
45,000	50,000	1,200	120	8,000,000	9,000,000	1,800	305
50,000	60,000	1,200	125	9,000,000	10,000,000	1,800	310

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TABLE E–7—DISTANCES WHEN EXPLOSIVE EQUIVALENTS APPLY

TNT equivalent weight of propellants	Distance in feet	
	To public area	Intraline unbarricaded
Not over		
100	1250	80
200	1250	100
300	1250	120
400	1250	130
500	1250	140
600	1250	150
700	1250	160
800	1250	170
900	1250	180
1,000	1250	190
1,500	1250	210
2,000	1250	230
3,000	1250	260
4,000	1250	280
5,000	1250	300
6,000	1250	320
7,000	1250	340
8,000	1250	360
9,000	1250	380
10,000	1250	400
15,000	1250	450
20,000	1250	490
25,000	1,250	530
30,000	1,250	560
35,000	1,310	590
40,000	1,370	620
45,000	1,425	640
50,000	1,475	660
55,000	1,520	680
60,000	1,565	700
65,000	1,610	720
70,000	1,650	740
75,000	1,685	770
80,000	1,725	780
85,000	1,760	790
90,000	1,795	800
95,000	1,825	820
100,000	1,855	830
125,000	2,115	900
150,000	2,350	950
175,000	2,565	1,000
200,000	2,770	1,050

PARTS 421–430 [RESERVED]

PART 431—LAUNCH AND REENTRY OF A REUSABLE LAUNCH VEHICLE (RLV)

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